Are you a business leader interested in how Artificial Intelligence can lower costs, drive affordability and increase organizational output? Are you an IT leader who knows a lot about AI, but need to understand if AI fits within your overall strategy to innovate for the future? Then this paper is for you!

This primer is *not* an exhaustive technical overview of AI, but instead pulls the curtain back on AI to reveal the baseline capabilities needed *before* AI can deliver value and a competitive-edge for your organization.

Artificial Intelligence (AI) is one of the most trending "emerging technologies" currently discussed in business and government. *Bloomberg Government* lists AI as one of the top ten markets in which it expects agencies to spend more money on contracting in 2019, driven by a new federal strategy from the Trump Administration, and major AI awards slated for the Army and The Intelligence Advanced Research Projects Activity (IARPA). But AI is also one of the most sensationalized and misunderstood topics, as it's either described as a cure-all solution, or as an ominous forebear to doomsday. Unfortunately, these depictions tend to offer more 'clickbait' than substance. Despite the hyperbole, AI does offer enormous practical benefits. In fact, AI is already at work in our businesses, government, and even our homes. Just ask Siri, Alexa or Google. Yet the allure of AI is offset by uncertainty from potential adopters who grapple with whether or not their organization is ready to start the journey to AI.

Before AI can reach its potential for your organization, it requires a solid foundation of these key business and technical competencies that have converged to make AI cheaper and easier to implement than ever before.

1. Ability to ingest and process **Big Data**.
2. Access to continually improving and evolving **Machine Learning (ML)**.
3. Availability of **More Powerful** and **More Affordable Computing Power**.
4. Improved **Data Visualization** and **User Experience,** enhancing Business intelligence.

So before seeking out an AI solution, potential adopters should first assess their organization's ability to deliver in each of these areas, then determine if they can be collectively leveraged for AI. Achieving this will allow them to solve increasingly complex challenges of our always-on digital world, or risk being overtaken by more savvy data-driven competitors.

The road to AI begins with Big Data. Business and government's increasing reliance on digital technology is creating massive amounts of information that couldn't previously be managed – let alone offer rapid, actionable insights – without new, powerful computational tools, driven by AI**.** Organizations now use big data-fueled AI to discover insights they otherwise would have missed, if processed via traditional methods. Businesses and governments harness AI-powered big data to advance their economic interests, improve the efficiency of services, and (with the right

amount of data) even predict future outcomes with remarkable accuracy. This rapid digitalization and volume of information has hastened the adoption of AI and its complimentary subset, Machine Learning.

While AI gets all the hype, **Machine Learning** (ML) is the unsung hero. Machine Learning enhances AI by allowing applications the ability to use data to continually "learn", without ongoing manual programming. As a subset of AI, ML uses data to identify patterns that are beyond human detection and then builds models based on that data, not guesswork or assumptions, to more clearly explain the world for better decision making.

While Big Data helps fuel Machine Learning, **next generation computers** are providing an unprecedented boost to properly scale AI capabilities. This was driven in large part by the evolution of Graphics Processor Units, or GPUs. Originally designed for 3D game rendering, GPUs better handle the massive computations needed for building AI architecture, when compared with traditional Central Processing Units (CPUs). Simply put, GPUs make A LOT of computations at the same time, exceeding the capabilities of legacy CPUs and their limited Random-Access Memory (RAM). The next evolution of GPUs is tensor processing units, or TPUs. Developed by Google, TPUs are an AI accelerator specifically designed for neural network machines[1]. TPUs will make AI systems for enterprise applications much faster and more efficient.

The last piece of AI's foundation is data visualization and how improvements are making it easier for more people to understand once complex data sets. By making it easier to understand and act on data, organizations no longer need to rely solely on highly-trained and expensive data scientists to interpret AI's outputs. Rest assured – talent still matters! Your organization will need data scientists, data analysts and programmers. As your agency matures, you can even establish a Center of Excellence to continue fostering AI advancement. But improving visualizations and user experience will empower more employees to be more efficient in their roles, ultimately raising the effectiveness of AI and their organization. Big commercial vendors are already investing in these areas with full-solution stacks and APIs that support popular AI needs.

Another term widely discussed with AI these days is **Robotic Process Automation**, or ***RPA***. This complimentary AI capability enables digital scripting language to run across multiple, existing systems to bring them together to work better. Machine Learning then identifies trends and patterns to reveal improvements that can then be built back into the RPA scripts to drive ongoing automation. Many commercial vendors now offer RPA licensing to automate previously rote or manually intensive activities, often resulting in significant ROI.

[1] Neural Networks are a specific set of algorithms that have revolutionized machine learning. They are inspired by biological neural networks, like the neurons in the human brain.

So how do you know if AI is ready for your organization? Your organization will have access to big data that can continually 'feed' an AI algorithm. Over time and with more data, Machine Learning will iteratively refine and improve the underlying algorithm for more accurate results. This, coupled with an enhanced user experience that enriches AI with actionable visual insights, will ultimately provide a clearer path forward for your users to save time or money - improvements that couldn't otherwise be accomplished via traditional methods.

Once your organization has these foundational capabilities in place, what's next? Ideally, business and IT leaders will collaboratively identify a narrow pain point which is a strong candidate for AI disruption. Once there's consensus on this narrow AI use case, an agile approach for implementation will focus on rapid value delivery via the iterative creation of a minimum viable product. This process of review and refinement will help leadership make a more informed decision regarding their vision for AI. In government, contract officers will also be prepared to either extend the contract and have the vendor continue building AI functionality, or re-compete it. So, if it's not working, they have the flexibility to try something else. This incremental approach is less costly, less risky and more adaptable to improve. Importantly, your organization may not need to start from scratch - AI technology can also be built off legacy systems to help future-proof organizations for the challenges of tomorrow.

This is of course an overly-simplified approach. Fortunately, there are system integrators to help organizations understand how to implement AI. **OnPoint's experience in data engineering and intelligent automation, access to a mature AI practice via our parent organization Publicis.Sapient, and our ongoing strategic partnership with Google, enables us to harness AI to improve mission impact for our federal customers.**

OnPoint has helped government implement foundational AI capabilities to solve complex real-world challenges. This is demonstrated by our work at the Department of State Consular Affairs office and their Consular Consolidated Database (CCD). The CCD is one of the largest Oracle-based data warehouses in the world, containing over 165 million visa cases, 123 million photographs, and terabytes of unstructured data with a growth rate of roughly 35,000 visa cases per day. OnPoint implemented an SAP HANA in-memory approach to data storage and retrieval. This advanced processing setup harnessed the power of ML to analyze data and provide near real-time results, improving performance with new, more flexible and powerful search tools, as well as analytical engines to support predictive modeling. Ultimately, queries that once ran in 4-6 hours were reduced to less than 40 seconds. **The State Department could build off this foundation by pursuing more mature AI capabilities to ensure America's diplomatic cadre remain competitive with countries around the world who are already leveraging AI and other society-changing technologies.**

OnPoint also enjoys streamlined access to 1,700 AI and Data Scientists, Big Data Engineers, and Data Analysts via the Publicis.Sapient platform. Drawing from *Sapient Inside*, OnPoint can tap a global talent pool of key tech and AI specialists, then embed them within projects for significant value delivery. So we're prepared to help your organization on the AI journey from the start. (See *Appendix, Figure 1. The Pillars of an AI Strategy* below for Publicis.Sapient's overarching AI strategy.)

Rounding out OnPoint's experience and deep bench of AI experts is our partnership with Google, who is at the forefront of AI and ML application. **Google's Machine Learning Engine is democratizing AI for more organizations, since it offers scalable, flexible pricing options to fit a range of projects and budgets.** Within the past year, Google has implemented massive price reductions for its Machine Learning Engine managed services, which allows developers to train and run custom ML models, as well as provide automatic tuning of algorithm parameters and a wealth of prebuilt ML systems. Google also offers a transparent pricing calculator to estimate costs for use of their Machine Learning Compute Engine[2] to help plan for a range of AI needs.

Chances are, you've heard all the hype when it comes to AI. Hopefully with this background, you now have a better understanding of how to translate hype into reality. If you're an IT or business innovator looking to deliver more value by increasing organizational output, streamlining processes, and reducing labor costs by automating manual tasks, then consider preparing your organization for AI. It will require thoughtful planning, but our AI experts can offer a real-world assessment to guide you on this opportunity. To find out if AI is a good fit for your agency and what tools may be available to help determine costs and requirements, reach out to innovation@onpointcorp.com.

About OnPoint

OnPoint Consulting, Inc. (OnPoint) delivers secure IT infrastructure, enterprise systems, cybersecurity and program management solutions for the U.S. federal government. Our specialized strategy, cyber and technology capabilities are changing the way our clients improve performance, effectively deliver results and manage risk. OnPoint holds ISO 9001:2008, ISO 20000-1:2011, ISO 27001:2013 certifications and a CMMI Maturity Level 3 rating.

OnPoint is a part of the Publicis.Sapient platform, with access to industry leading AI tools and teams. Contact us at innovation@onpointcorp.com or visit onpointcorp.com to learn more about us and our services.

[2] https://cloud.google.com/products/calculator/

Appendix.

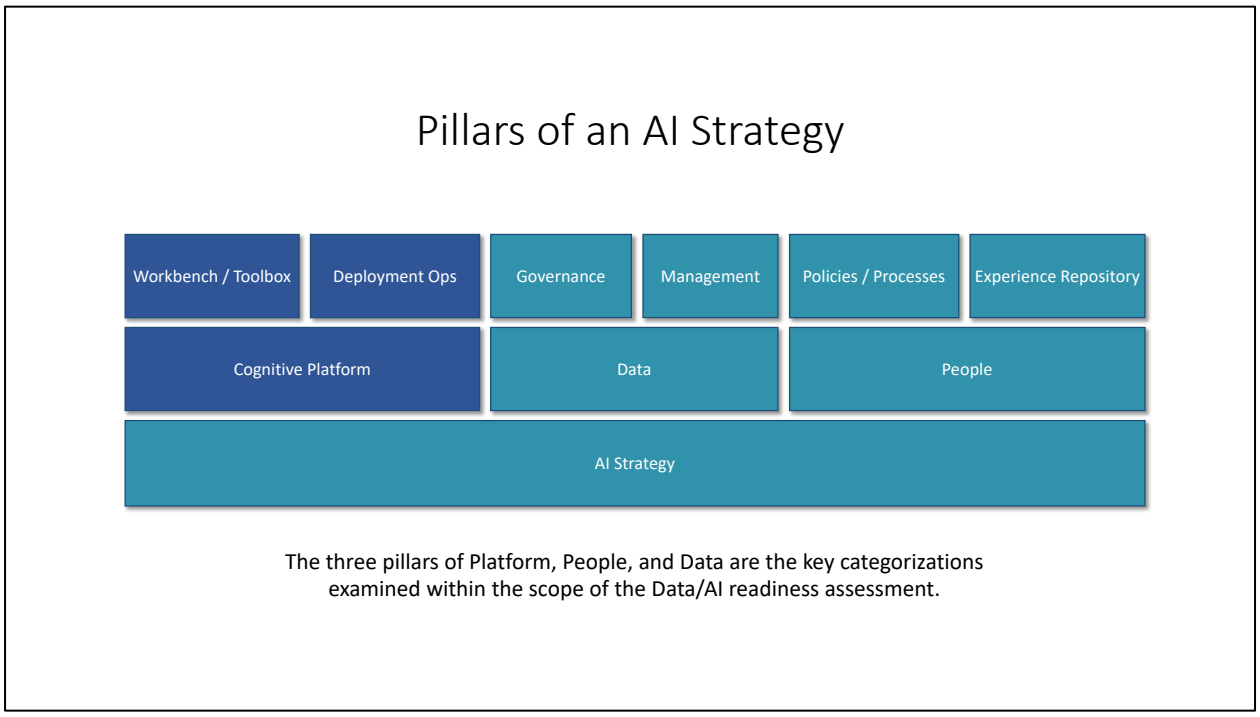

Figure 1. The Pillars of an AI Strategy

COGNITIVE PLATFORM: Using a Cognitive / AI Platform enables users to extract insight, infer meaning, correlate data, and deliver experiences. It invites exploration and experimentation, and becomes the core of identifying and delivering rich and meaningful experiences for your users. It can also provide resources to standardize the language used internally to help break down artificial barriers of understanding, allowing research to leverage diverse sources of knowledge.

DATA: Data is at the core of your AI strategy. It is the fuel for your knowledge generation and it requires proper management and governance. The readiness of your data with respect to the six quality attributes will directly affect the quality of AI services that can be delivered.

COE/COP: A Center of Excellence or Community of Practice helps ordain the use and management of the resources, inputs, and outputs from your Cognitive / AI Platform. Building the mindset of experimentation and exploration – both with data and experiences – will accelerate the delivery of value. In addition, it establishes a level of academic rigor that will aid in the efficient delivery and testing of concepts.